

REMARKS

Rejections in the Office Action

Claims 1-3, 5-6, 31-34 and 36 in this application stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Ishida et al. (U.S. Patent No. 4,455,281, referred to as "Ishida" herein) in view of EP 0831211. This rejection is respectfully traversed.

Claim 1

Amended Claim 1 of the present application specifies a refractory metal carrier comprising a tube of corrugated construction, the carrier having coated thereon an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent, the carrier being adapted for use in a conformable catalyst member. Claim 1 recites the limitation that the carrier is comprises a tube of corrugated construction, and claim 1 recites that the carrier is adapted for use in a conformable carrier member. Conformable means that the carrier containing the catalyst can be bent to the shape of a curved or bent configuration.

The examiner admits that Ishida does not teach a tube of corrugated construction. Despite the explicit teachings in Ishida to the contrary, the examiner maintains that the plates in Ishida can be bent. Ishida, however, specifically states that the thickness of the metal plate "is preferably thin, but **toughness of the metal plate is required in order not to easily yield to deformation.**" (col. 4, lines 51-53 (emphasis added).) Regarding the

Examiner's reliance on Figures 5-21 of Ishida for the proposition that substrate can be bent, it is Applicants' position that Figures 5-21 do not show or suggest a carrier that is bent or capable of being bent. The carrier plates shown in Figures 3 and 4 are corrugated, but Figures 3 and 4 do not disclose or suggest carriers that can be bent and retain the anchor layer on the carrier when the carrier is bent. Figures 3, 22, and 23 each show a plurality of plate-shaped carriers in a straight (not bent) stacked configuration, and there is no teaching or suggestion in Ishida to bend the plates so that the anchor layer is retained after bending. A person of ordinary skill in the art reviewing the specification and Figures 3, 22, and 23 of Ishida would be motivated to provide rigid plates that can be arranged in a stacked array. As discussed above, Ishida teaches that the plates should be sufficiently thick and tough so that the plates do not easily yield to deformation.

EP 0831211 is cited in the office action for the alleged teaching that an exhaust emission control device can have a catalytic metal bearing (or support) member which can be corrugated tube shape, citing item 13 in Figure 4 or item 22 in Figure 7).

EP 0831211 does not cure the deficiencies noted above in Ishida. First, EP 0831211 does not disclose or suggest a carrier having an intermetallic anchor layer for retaining a catalytic material. Instead, EP 0831211 teaches a carrier made from thin, porous steel sheets having a layer of catalytic material such as platinum or

rhodium directly formed on the steel sheet in the shape of a cylinder surrounded by a corrugated, support member that does not include a coating. (column 6, lines 14-24; col. 5.)

The examiner has fails to explain why one skilled in the art would look to the teachings of EP 0831211, which does not include an intermediate layer, to provide a tube of corrugated construction having an anchor layer. According to the MPEP, § 2142:

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Here, the examiner has failed to provide any motivation for combining the teachings of Ishida, which requires substrate having an intermediate layer to retain the catalyst on a non-deformable plate-shaped substrate, with EP 0831211, which teaches a cylindrical substrate that does not include an intermediate layer. The examiner appears to be relying on impermissible hindsight to combine elements from the prior art to arrive at applicants' claimed invention.

In the Office Action, the examiner cites to item 22 in Figure 7 of EP0831211. Applicants note that in EP 0831211,

the corrugated sheet, item 22 in Figure 7, serves as a cushion for catalytic bearing member 22, which is in the form of cylinder. There is no teaching or suggestion in EP 0831211 of a corrugated tubular carrier that includes an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent and adapted for use in a conformable catalyst member. While item 22 in Figure 7 is a corrugated sheet, it does not have a catalytic layer or an intermetallic layer formed thereon and thus cannot be considered to be a carrier having an intermetallic layer thereon. The catalytic bearing members disclosed in EP 0831211 do not include intermetallic anchor layers for retaining the catalytic coating.

Furthermore, claim 1 is directed to a carrier comprising a tube of corrugated construction. There is no teaching or suggestion in Ishida or EP 0831211 of carrier comprising a tube of corrugated construction that can be bent. As discussed above, the carriers disclosed in Ishida must be rigid and non-deformable, and the carriers in EP 0831221 are also rigid and not capable of being bent because the corrugated cushion member which does not contain any coating is attached to the catalytic member which contains only a catalytic coating. As discussed above, the carriers in EP 0831221 do not include an intermetallic anchor layer. While the carrier disclosed in EP 0831211 may be tubular, it is not adapted for use in a conformable catalyst member, and it is not of corrugated construction merely because it is attached to a corrugated

cushion member. Applicants respectfully submit that the tubular carriers disclosed in EP 0831221 are similar to those disclosed in Applicants' specification at page 13, lines 25-28, which teaches that the carriers comprising a tube of corrugated construction can be used in curved portions of exhaust systems together with rigid, tube-like catalyst members, which would be used in straight sections of the exhaust systems. Since neither Ishida nor EP 0831221 teaches or suggested a carrier comprising a corrugated tube, the Examiner has failed to establish a *prima facie* case of obviousness.

Accordingly, EP 0831211, like Ishida, fails to teach a carrier having an intermetallic anchor layer for retaining a catalytic material when the carrier is bent. The carriers of the catalytic bearing members in EP 0831211 are in the form of cylindrical sheets that are spot welded to corrugated sheet cushion member 22 so that the cushion member 24 deforms relative to the member 22 in the radial direction to accommodate different amounts of thermal expansion between the exhaust pipe 5 and the catalytic member 22. (col. 7, lines 1-10.) Such a construction, in which the corrugated cushion member is fastened to the cylindrical catalytic member would not provide a carrier for use in a conformable catalytic member, but instead one that is rigid. Since the cylindrical substrates shown in EP 0831211 are not corrugated or adapted to be used in a conformable catalyst member as required by Applicants' claim 1, EP 0831211 fails to cure the deficiencies in

Ishida, the Examiner has failed to establish a *prima facie* case of obviousness.

Ishida Teaches Away

Furthermore, the disclosure of Ishida, including the passage and the Figures discussed above, teach away from Applicants' claim 1, which requires a corrugated tubular metal carrier that includes an anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent. Claim 1 specifically recites that the carrier is adapted for use with a conformable catalyst member. Figures 3 and 3A provide an example of a conformable catalyst member, which is capable of being bent or curved to conform to bends or curves in an exhaust pipe. Ishida teaches away from such a metal carrier because Ishida requires the plate-shaped carrier to be resistant to deformation, and thus the carrier in Ishida could not be used in a conformable catalyst member. In this regard, Applicants point out that MPEP § 2141.02 requires that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." The Examiner's position that the disclosure of "thin" plates in Ishida teaches or suggests carriers that can be used in conformable catalyst members ignores the clear disclosure in Ishida that the plates should be rigid and not deformable. In this regard, Applicants direct the examiner's attention to the discussion under MPEP 2141.02 of the *W.L. Gore* case:

W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly.).

Applicants respectfully submit that the Examiner has failed to meet the burden of showing that Ishida and EP0831211 teach or suggest a carrier that includes an intermetallic anchor layer capable of retaining a catalytic coating applied thereto intact on the carrier when the carrier is bent and that is adapted for use in a conformable catalyst member. As such, Ishida and EP0831211 cannot provide the basis for a *prima facie* case of obviousness.

Claims 2-3, 5-6 and 31-33

For at least the reasons provided above with respect to claim 1, claims 2-3 5-6, and 31-33, all of which depend

from claim 1, are patentable over the cited art. With respect to claim 2, EP0831221 does not teach a tube have a perforations around it periphery. The examiner's citation to Fig. 16C is puzzling, as Fig. 16C shows a flat, non-corrugated plate with perforations. Regarding claim 5, EP0831221 does not teach alternating rings separated by annular webs. The examiner's statement that it would have been obvious to shape the catalyst this way assumes through the use of improper hindsight what has not been shown in the combined teachings of the references.

Regarding claim 31, Ishida and EP0831211 do not teach or suggest a carrier having an elongate body portion which is dimensioned and configured to be mounted within a curved or bent pipe having an open discharge end, the carrier having coated thereon an anchor layer suitable for having a catalytic coating applied thereto, the carrier having a distal end and a proximal end, the proximal end comprising a mounting member dimensioned and configured to be secured to the open discharge end of the pipe when the body portion of the carrier is disposed within the pipe.

Regarding claim 32 and 33, Ishida and EP0831221 do not teach or suggest the mounting member comprises an annular collar defining a mounting flange which is disposed radially outwardly of the proximal end of the catalyst member. The examiner fails to provide any statement or reasoning as to why these claims are rejected.

Claims 34 and 36

Independent claim 34, and claim 36, which depends from claim 34 also are not taught or suggested by Ishida and/or EP0831221. Claim 34 requires a refractory metal carrier comprising a plurality of perforated plate members having opposite faces and disposed in a face-to-face linear array to impart a cylindrical shape to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces which space adjacent plate members from each other, the carrier having coated thereon an intermetallic anchor layer adapted for use in a conformable catalyst member that can be placed in a bent or curved configuration. Neither of the cited references teaches such a structure, namely a carrier with an intermetallic layer having a face-to-face linear array and forming accordion pleats. In addition, as discussed above with respect to claim 1, neither of the cited references teach a carrier that can be used in a conformable catalyst member that can be placed in a bent or curved configuration. As noted above, Ishida teaches away from such a carrier plate. For at least these reasons, claims 33-36 are patentable over the cited references.

The office action fails to state particular reasons as to why claims 34 and 36 are obvious over the cited references. Withdrawal of the rejection is respectfully requested.

Claims 30 and 35

Claims 30 and 35 stand rejected as allegedly being obvious over Ishida in view of EP0831211 further in view of Donomoto et al. U.S. Patent no. 4,798,770 ("Donomoto et al.") or Draghi U.S. Patent no. 6,042,879 ("Draghi et al."). Donomoto et al. or Draghi et al. are cited for the teaching of an anchor layer comprising nickel and aluminum.

The deficiencies of Ishida and EP0831211 are noted above with respect to claims 1-3, 5-6, 31-34 and 36. Neither Donomoto et al. nor Draghi et al. cures these deficiencies. Et al. pertains to a heat resisting alloy article having a sprayed, alloyed layer formed over a composite fiber/light alloy layer. There is no teaching or suggestion of a carrier comprising a tube of corrugated construction or of the structure recited in claim 34. Draghi et al., like Ishida, teaches coating apertured articles, but not the type of refractory metal carrier as recited in claims 1 and 34.

The Examiner relies upon Donomoto et al. to supply the teaching of Ni-Al alloys because Donomoto allegedly teaches that Ni-Al alloys are heat and corrosion resistant (citing column 5, lines 51-63 of Donomoto et al.)

The teachings of Donomoto et al. and Draghi et al. fail to cure a deficiency in Ishida et al., namely substitution of the intermediate layer taught by Ishida et al. with a layer containing Ni-Al. As the Examiner admits, Ishida et al. teach metal plates made of steel, and stainless steel plates (Ishida et al. col. 4, lines 59-61). The Examiner admits that Ishida et al. teach that the

electric arc sprayed layer should be the same material as the metal plate (Office Action at page 4, and Ishida et al., col. 5, lines 9-10). The Examiner's stated motivation for substituting the metals taught by Donomoto et al. and Draghi et al. is that the "the teaching of Ishida '281 should not be limited to just the exemplified metals". (Office Action at page 4). The Examiner appears to take the position that because Ni-Al alloys are heat and corrosion resistant, one of skill in the art would substitute the Ni-Al alloys allegedly taught by Donomoto et al. or Draghi et al. with the materials taught in Ishida et al. Applicants respectfully submit that none of the cited prior art references or the knowledge in the art generally teach that Ni-Al intermediate layers have improved heat or corrosion resistance as used in intermediate catalyst layers. Neither Donomoto et al. nor Draghi et al. pertains to catalysts, and neither reference pertains to improving the bond between catalytic material formed on an anchor layer of a catalyst member. Applicants respectfully submit that the Examiner has used impermissible hindsight to glean from Applicants' patent application that Ni-Al can be electric arc sprayed as an intermediate layer, and not from any fair teaching or suggestion in Donomoto et al. or Draghi et al. Accordingly, the Examiner has failed to establish a *prima facie* case of obviousness.

Applicants respectfully submit that the Examiner has used impermissible hindsight to combine Ishida et al. and Donomoto et al. Donomoto et al. discloses coating a composite fiber/light alloy layer formed on a body with Ni-

Cr-Al alloys by plasma spraying to form automobile engine parts such as pistons (see, claim 1 and the Abstract). There is no teaching or suggestion in Donomoto et al. of forming coatings on a carrier substrate by electric arc spraying to provide a catalyst member. As stated in MPEP Section 2143.01, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." Applicants respectfully submit that the Examiner has not provided proper motivation to combine the teachings of Donomoto et al. with the teaching of Ishida et al.

Regarding Draghi et al., this reference also discloses plasma spraying alloy coatings. There is no discussion about forming an intermediate layer on a catalyst member to improve adhesion of a catalytic material on an anchor layer containing nickel and aluminum. Draghi et al. teach that "[i]t is desirable to apply the MCrAlY coating by plasma spray process since plasma spraying is relatively inexpensive . . ." (see col. 4, lines 15-19). Applicants respectfully submit that the skilled artisan would not be motivated to combine Ishida et al. with Draghi et al. because the plasma spraying process would destroy the intended function of providing an intermediate metal alloy layer on a catalyst substrate that retains a catalyst

material formed over the alloy layer formed by electric arc spraying.

Rejection of Claims 1-3, 5, and 30-36

Claims 1-3, 5, and 30-36 stand rejected as allegedly being unpatentable over Gorynin U.S. Patent No. 5,204,302 ("Gorynin") in view of EP0831211, optionally further in view of Rondeau U.S. Patent No. 4,027,367 ("Rondeau") and Ishida.

The examiner relies on Gorynin for the alleged teaching of an adhesive layer of nickel and titanium, aluminum with at least one or more of Co, Cr, Mo, Ta, Nb, Ti or Ni, or silicon with at least one or more of Ti, Nb, Cr, W, Mo, Ni or Ta, citing column 2, lines 35-35. Although the office action states that the claims are obvious over the combination of Gorynin in view of EP0831211, the office action provides no statement or reasoning as to why one skilled in the art would have combined the teachings of the two references. Applicants respectfully submit that the office action fails to meet the initial burden required to establish a *prima facie* case of obviousness. See, e.g., *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992) ("[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.... If examination at the initial stage does not

produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.").

As noted above with respect to the combination of Ishida and EP0831211, EP0831211 does not teach a corrugated, tubular substrate as recited in claim 1 or the structure recited in claim 34, namely a plurality of perforated plate members in a face-to-face linear array to form a cylindrical sheet to the carrier and to form accordion pleats, the plate members having protrusions extending from their faces. Furthermore, Gorynin and EP0831211 fail to teach or suggest the structure recited in claims 5, 31, and 32.

Regarding claim 6, aside from the deficiency in the rejection of independent claim 1, applicants respectfully point out that the reliance on Rondeau to supply the teaching of electric arc spraying does not establish a *prima facie* case of obviousness. The Examiner relies on Rondeau for the alleged teaching that electric arc spraying can be used to spray an alloy of Ni-Al onto a substrate to establish a diffusion bond between the Ni-Al coating and the substrate at a lower cost than the plasma spraying method of Gorynin et al. Applicants respectfully point out Rondeau does not pertain to catalyst members or teach or suggest the problem of improving the bonding of an anchor layer and a catalyst formed on such an anchor layer. Instead, Rondeau merely pertains to forming a bond between a substrate and an alloy layer. There is no discussion whatsoever in Rondeau of a catalyst layer disposed on the electric arc-deposited alloy. Furthermore, there is no

teaching or suggestion of applying a Ni-Al to a conformable carrier. There is no teaching or suggestion in Rondeau of improving the bonding between an intermediate layer and a catalyst layer formed thereon. At most, the examiner has establish a case of obvious to try, which is not sufficient to establish obviousness. The Examiner's stated position appears to be based on impermissible hindsight based on applicants' disclosure, and not from any fair teaching or suggestion found in Rondeau or Gorynin et al.

The examiner further optionally relies on Ishida for teaching electric arc spraying. However, as noted above, Ishida teaches away from conformable catalyst members, as Ishida teaches that the plate members should be resistant to bending. Accordingly, the skilled artisan reading Gorynin seeking to make a conformable catalyst would not substitute electric arc spraying on rigid plate members. Applicants respectfully request withdrawal of the rejection.

Conclusion

Reconsideration of the above-referenced patent application in view of the foregoing amendment is respectfully requested. It is not believed that any fees are due. If any fees are due, however, the USPTO is authorized to charge Deposit Account No. 50-3329.

The undersigned was authorized by Richard A. Negin, Reg. No. 28,649, an attorney of record in the subject application, to prepare and file this Amendment on behalf of the Assignee. Correspondence should continue to be

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Respectfully submitted,

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